



Embedding TVET in Industrial Strategies: Implications for the PSET strategy

Skills for Industry Policy Brief South Africa #1 (2020)

At a glance

A company survey administered across three manufacturing sectors in South Africa shows that companies report having had difficulties in finding skilled operators and technicians over the last five years. This shortage of skills is reported to have affected their operations and growth negatively. However, there is significant variation in terms of the degree to which the lack of skilled operators and technicians has affected firms in the three industries.

Companies in the automotive industry report to be least constrained by the lack of skills. With little difficulty in finding suitable operators and some difficult in finding technicians, neither shortage is reported as having affected this sector in a significantly negative way. On the other hand, companies that operate in the Food and Beverage sector or the Clothing and Textile sector are more affected by the skills shortage of both occupations. Almost all companies in the Food and Beverage sector and the Clothing and Textile sector that report to struggle finding qualified technicians claim that this has affected their operations negatively.

A key finding of this study is that the variances with respect to reported skills shortages are consistent with the extent to which TVET appears to be a consideration at the point of hiring in each industry. The study also found that there is a greater focus on TVET programmes at higher occupational levels. The Automotive sector, which has

been the focus of industrial policy and that has an explicit training strategy, reports fewer shortages. The sector shows a strong usage of TVET both pre- and in-employment and across occupational levels, including at lower skill levels. The Food and Beverage sector shows more variation among its firms where there are shortages and where there are not. Just over a third of companies in our sample are using TVET pre and in-employment; of those that do use TVET, companies report using three or more programmes. The sample is not though large enough to make an absolute statement but this variation within the Food and Beverage sector appears to relate to the size of companies and their level of exports. The data demonstrates that exporting and the use of TVETs is related. Firms that are exporting are correlated with more advanced technology and more advanced products, and therefore, a higher skill level. Firms in Automotive sector and the Food and Beverage sector with larger shares of exports are more likely to utilize a larger number of TVET programmes as a hiring criterion. This pattern is less observable for firms in the Clothing and Textile sector. Clothing and Textile—a sector in crisis, despite years of industrial policy—reports significant shortages but appears to hardly engage with formal TVET, both at the level of pre- and in-employment training. These findings raise the question as to whether companies in the Clothing and Textile industry have difficulties in securing the relevant skills because they do not recruit from TVET programmes or encourage employees to undertake these programmes,

or whether they have difficulties because the TVET programmes that currently exist do not meet their needs and are therefore not perceived of as requirement or as relevant for existing employees. (Note: the approach to analysis is provided in more detail in a full working paper, Allais et al 2020.)

Introduction

In South Africa, like many developing countries, policy makers have prioritized the expansion of technical and vocational education and training (DHET 2019; National Planning Commission 2011), with a view to ensuring that TVET college sector enrolls half of the post-school student cohort. The national plan of the Department of Higher Education and Training emphasizes that these TVET colleges should ensure workplace-based experience to increase employment prospects of students, and to increase opportunities for the private sector to improve how their skills levies are used, as well as to provide training for future and current employees (DHET 2019). This is not the first time that South Africa has attempted to transform the TVET colleges, and despite a multiplicity of interventions there is still a widespread view amongst policy makers and industry that graduates of TVET colleges do not meet their needs, and the TVET system remains weak (Allais 2013; 2020).

There are multiple studies that trace graduates of TVET Colleges to understand the pathways that these graduates follow and whether they access the labour market and are able to utilize their skills (SSA-CI, JET, and NBI 2016; Boka 2017; Rogan et al. 2018; REAL 2018). This brief offers a complimentary perspective. It reports on a survey that explored the extent to which companies recognize the importance of TVET programmes and the impact of having new entrants and employees with TVET qualifications on transformation (changes in the workplace relating to work organisation, technology and products) and ultimately on inclusive growth.

The survey is part of a large comparative study being conducted to explore the contribution of TVET programmes to industrial growth and transformation of manufacturing companies in six countries: Bangladesh, Cambodia, Ethiopia, Laos, South Africa, and Vietnam. Prior to the survey a contextual analysis of each country was conducted through a literature and document review. The survey of companies in two or three sectors in each country was then conducted. The survey focused on exploring the perceived relationship between the provision of TVET programmes for employees at different occupational levels and transformation and inclusive growth on the one hand and on the other hand the extent to which employers perceive skills shortages to be a constraint to transformation and growth. The survey also sought

Industry	14% Contribution to GDP	Rand Value contribution to GDP	Employment numbers	Levels of Automation	Government Support
Country GDP	R5 trillion				
Manufacturing	14%	R700bn			
Automotive	3.38 (2018)	R169bn	128,532 (2018)	Highly Automated sector particularly the auto assembly plants	The sector is heavily subsidized and protected through tariffs
	Industry supported by industrial policy; important in terms of linkages				
Textile and Clothing	1.23% (2018)	R15bn	106,326 (2018)	A small number of companies in this sector which has embrace significant automation	The sector enjoys significant government financial and technical incentives.
	This sector was selected across all countries in the study.				
Food and Beverages	6.93% (2018)	R347bn	309,646,(2018)	Major segments of the sector are significantly automated	Some sub-sectors like agro-processing forms part of government support

Table 1: Overview of the industrial sectors in our study****

to probe the specific TVET programmes utilized by industry. In-depth qualitative work is currently underway in a smaller selection of companies.

The key features of the industries included in the South African survey are shown in Table 1.

Insights from the survey

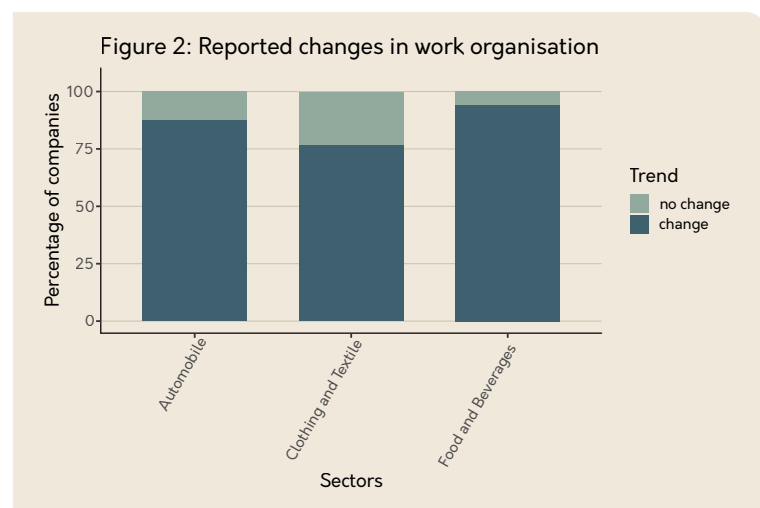
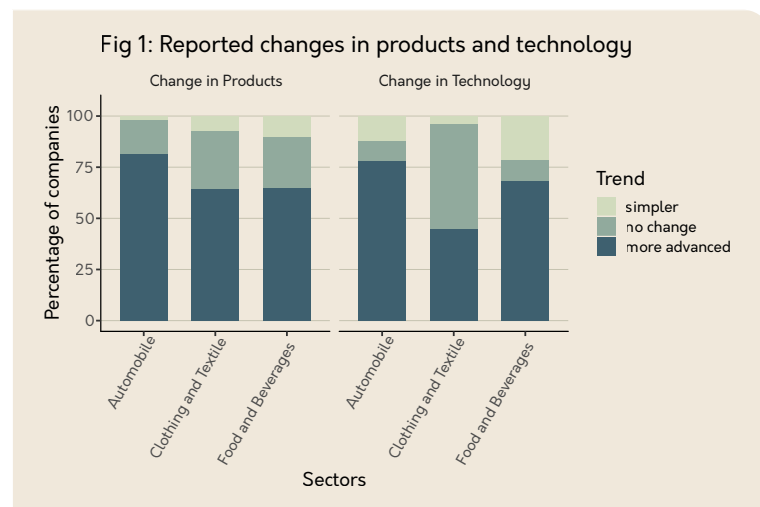
A focus on growth and transformation

The majority of companies in our survey reported having grown their sales during the past 5 years across industries, although there were some companies in all three sectors that reported having decreased their sales during this period or having made no change at all. This is not in line with trends in the Clothing and Textile sector, a struggling sector, which experienced its fourth consecutive year of production decline in 2018, contracting by 2,4% in 2018. The other two sectors showed some general growth in sales.*

This was also true for employment figures, where Clothing and Textile experienced some decline, and the other two sectors small increases, although with some differences within and across industries in terms of occupational categories. For example, in the Automotive sector a similar number of companies decreased and increased their number of general workers, with a significantly larger number of companies experiencing growth in the number of operators rather than no change or a decrease. This was also true for technicians, although the difference in the number of companies that grew these numbers and those that decreased is smaller. The pattern is similar with respect to supervisors. In the Clothing and Textile sector, we found that the majority of companies reported growth in the number of general workers and operators with little to no change in terms of supervisors and technician numbers. In the Food and Beverages sector, there is again a different picture. The majority of companies reported an increase in general workers; there is only a small difference between those who report an increase in the number of operators as those who report no change. With respect to supervisors and technicians, the majority of companies report no change.

When reflecting on occupational growth in terms of gender we found that the majority of companies in the Automotive sector report an increase in the number of women in all occupations. However, in the Clothing and Textile sector this increase of women is true with respect to general workers and operators, but the majority of companies report no change in terms of supervisors and technicians. In Food and Beverages, we found that most of companies who answered the question reported an increase of females across all occupations except for artisans. However, perhaps surprisingly the vast majority of companies in Food and Beverages did not or could not answer this question. This occurred also in the other two sectors, but to a much lesser extent.

Figures 1 and 2 below show that almost across the board technology and products have become more advanced, over the past 5 years. At the same time work organization has changed in the vast majority of companies.



A disaggregation of these findings showed that both Automotive (78.4%) and Food and Beverages (68.5%) report technology becoming more advanced in their companies. In the Clothing and Textile sector, on the other hand, less than half of all companies report that technology has become more advanced (44.8%), while more than half report no change at all (51.7%). Changes in technology and changes in products coincide and move in the same direction. This correlation is driven mainly by firms in the Automotive sector while the pattern is less clear for firms in the other two sectors; this seems plausible, as more advanced products are likely to require a more advanced technology, as shown in Table 3 below.

experienced the need to restructure towards a more skilled workforce more than firms in the Food and Beverage industry.

Firms were asked to reflect on the extent to which they experience skills shortages. Their responses indicate that skills shortages follow an occupational hierarchy. While the majority of responding companies (76% - 100%) indicate that they find it difficult or significantly difficult to recruit technicians with the required skills, the skills shortage is less severe for finding suitable operators. Companies do not typically report skills shortages at lower levels including general workers.

Products	Significantly simpler	Somewhat simpler	No change	Somewhat more advanced	Significantly more advanced	Total
Technology						
Significantly simpler	0%	1%	3%	3%	1%	8%
Somewhat simpler	0%	0%	0%	2%	1%	3%
No change	0%	0%	9%	6%	6%	22%
Somewhat more advanced	2%	1%	6%	19%	8%	36%
Significantly more advanced	0%	1%	4%	7%	19%	31%
Total	2%	3%	23%	37%	35%	100%

Table 2: Distribution of firms by change in products and change in production technology

Impact of transformation of the workplace on skills

Across the three sectors, the majority of companies indicate that they require a more skilled workforce due to changes in products and technology. Table 3 below shows on companies' responses on changing skills requirements in relation to changes in products and production processes. Companies in the Automotive sector and the Clothing and Textile sector have

In response to the question as to whether skills shortages have an effect on company operations, we again found an occupational hierarchy with respect to the difficulty of finding a suitable worker and company performance. These constraints are experienced differently across the three sectors.

Across all sectors, companies report that the difficulty of finding skilled technicians is linked to a negative

Industry	Automobile	Food and Beverage	Clothing and Textile	Total
Change in skills requirement				
Significantly less skills	4.6%	10.5%	0.0%	4.7%
Somewhat less skills	6.8%	10.5%	0.0%	5.9%
Same skills as before	13.6%	21.1%	22.7%	17.7%
Somewhat more skills	45.5%	57.9%	59.1%	51.8%
Significantly more skills	29.6%	0.0%	18.2%	20.0%
Total number of firms	44	19	22	85

Table 3: Implications of changing products and production technology for skills

impact on company operations. However, the skills shortage seems to affect company performance in different ways in each sector. While companies from the Automotive sector experience a shortage of skilled technicians, 43% of them report that operations are not affected by this problem, with an additional 48% stating that their operations are only somewhat negatively affected. The lack of skilled technicians is more problematic for companies in the other two sectors. Almost all companies in the Food and Beverage sector and the Clothing and Textile sector that report struggling to find qualified technicians claim that this has affected their operations negatively. The Food and Beverage companies in particular report being constrained by the lack of skilled technicians.

Similarly, the shortage of skills at operator level is perceived to have very little effect on growth in the Automotive sector, whilst this is not true of the other sectors, where almost half the companies that experience shortages at this level report that these shortages have negatively affected growth. The limited supply of skilled technicians in the South African labour market has also affected company growth negatively across the three sectors, but less than company operations and at varying degrees.

These findings led us to explore whether the changes with respect to workplace transformation have prompted companies to place a greater emphasis on TVET at the point of recruitment and/or for their existing employees. We found that there was no real pattern in terms of changing work organisation and the focus on TVET. This was in part explained by the fact that almost all companies have made such changes, making such an analysis meaningless. However, the patterns emerging with respect to changing technology and products require some attention. They offer valuable insights into how we understand TVET and its relationship to the ability of companies to implement operational changes in accordance with the industry strategy. This in turn begins to suggest ways in which we can think about strengthening this relationship in ways that enhance the relevance and value of TVET for inclusive transformation and growth.

A focus on skills, shortages, and TVET

This section considers the importance of TVET. It is important to note, however, that in response to our question about the most important pre-employment qualifications, many employers mentioned school qualifications. In response to the same question for in-employment programmes, many employers used a very broad definition of TVET programmes. While some referred to programmes that result in formal TVET qualifications, others included other certified work-related training programmes, such as health and safety.

None of the firms report significant shortages at the general worker level. However, there are key differences, even at this level, in terms of pre-employment TVET. The Automotive sector considers TVET programmes at the point of recruitment at this level, whilst the Food and Beverage does to a small extent, and Clothing and Textile, which reports the most difficulty at this level albeit still relatively low does not use any TVET programmes for general workers. At operator level, Automotive does not report shortages and does mention TVET programmes. In Food and Beverages about two thirds of the companies report difficulties at operator level, yet use fewer TVET programmes than firms in the Automotive sector. In Clothing and Textile, over half the companies experience difficulties, but there is very little mention of TVET. Finally, for technicians, three quarters of Automotive companies report difficulties, but also mention TVET programmes, while all Food and Beverage companies report difficulties, but mainly also mention TVET programmes. In Clothing and Textile, by contrast, the majority report difficulty, but here there are very few mentions of TVET programmes.**

For in-employment training the picture is similar. In the Automotive sector, the vast majority of companies indicate that they use at least one TVET programme for general workers, but two or more at operator and technician level. In the Food and Beverage sector, the majority use at least one TVET programme for general workers, three or more at operator level, and about two thirds use three or more programmes at technician level. A third of the companies in the Food and Beverage sector do not use formal TVET at this lev-

el. In the Clothing and Textile sector by contrast, for general workers around 60% of companies use one TVET programme for general workers with the rest not using TVETs for general workers at all; at operator level not one company uses more than one TVET programme and less than half use one. At the technician level the picture deteriorates even further—only 3% of companies use one TVET frequently while 97% use none.

A deeper dive into Changing Technology, Products and TVET

Reflecting on the relationship between changing technology and a focus on TVET provision for new recruits and existing employees highlights a clear pattern. This is most evident in the Automotive sector, where of the companies that report more advanced technology (78% of the companies), the vast majority (70%) mention two or more TVET programmes which their new employees have at operator level.

In Food and Beverages we also see an emphasis on TVET from those companies that have introduced more advanced technology, although to a lesser extent. That is, of the 68% of the companies that report more advanced technology more than half of these companies (57%) mention 2 or more TVET programmes at operator level.

Clothing and Textile is different: firstly we see that only 45% of the companies report more advanced technology. Of these, only 25% mention 1 TVET programme at operator level and a slightly smaller proportion mention no TVET up-skilling (20%). This is illustrated in the table 4 below.

There is a consistent trend with respect to technicians. In Automotive, we see that of the companies that report more advanced technology, more than half of these companies (52%) mention 2 or more TVET programmes that are undertaken by their employees.

Number TVET pr.	No TVET up-skilling	1 TVET	Total
Technology			
Somewhat simpler technology	3%	0%	3%
No change in technology	31%	21%	52%
Somewhat more advanced technology	3%	11%	14%
Significantly more advanced technology	17%	14%	31%
Total	55%	45%	100%

Table 4: Clothing and Textile, changes in technology and in-employment TVET usage, operators

Number TVET pr.	No TVET up-skilling	1 TVET	2 TVET	3 TVET	Total
Technology					
Significantly simpler technology	5%	5%	5%	0%	16%
Somewhat simpler technology	5%	0%	0%	0%	5%
No change in technology	5%	0%	0%	5%	11%
Somewhat more advanced technology	11%	5%	11%	37%	63%
Significantly more advanced technology	5%	0%	0%	0%	5%
Total	32%	11%	16%	42%	100%

Table 5: Food and Beverages, changes in technology and in-employment TVET usage for technicians

Number TVET pr.	No TVET up-skilling	1 TVET	Total
Technology			
Somewhat simpler technology	4%	0%	4%
No change in technology	50%	0%	50%
Somewhat more advanced technology	14%	0%	14%
Significantly more advanced technology	29%	4%	32%
Total	96%	4%	100%

Table 6 Clothing and Textile, changes in technology and in-employment TVET usage, technicians

In Food and Beverages, we also see that of the 68% of the companies that report more advanced technology almost half of these companies (48%) mention 2 or more TVET programmes that their employees are undertaking. However, of interest is that as much as 16% of the companies that report more advanced technology suggest that they are not focusing on TVET for up-skilling.

In Clothing and Textile, we also see that of the 46% of the companies that report more advanced technology, only 4% of these companies mention that their employees are undertaking TVET programme and respondents could only mention 1 programme. As much as 43% of these companies that report that their technology is more advanced are still not offering TVET for up-skilling.

With respect to changing products we did not find as strong a relationship between difficulties in accessing people with the relevant skills and the introduction of more advanced products in Automotive and Food and Beverages. However, the challenge with respect to accessing people with the relevant skills is slightly more of a reality in Food and Beverages than in Automotive. Interestingly, however, it is more of a challenge in Clothing and Textile. We see that 67% of the companies report advanced products with 41% of companies reporting that it is somewhat or significantly more difficult to find skills. Despite these challenges, the Clothing and Textile industry still do not mention that their employees are accessing more than 1 TVET programme.

Implications

The study found that the number of TVETs used during the hiring process is strongly correlated with the number of TVETs for in-employment up-skilling. It suggests that firms that use a higher number of TVETs to identify suitable candidates in the hiring process are also more likely to upskill their workers with formal vocational programs. This holds for operators and technicians and is robust to the inclusion of controls for industry sector, changes in product, changes in technology and exporting. This pattern characterised mainly companies from the Automotive industry and least companies in the Clothing and Textile Industry. The findings from the first two stages of the research highlight that companies typically require general education (Grade 12) as their minimum condition for hiring.

The Automotive industry indicates a strong focus on TVET programmes and has put in place training facilities to meet their demand because of concerns relating to the relevance and quality of the TVET colleges. This is strongly contrasted with the trends in the Clothing and Textile industry, which has limited focus on formal TVET. This is despite the reality that the industry has recognised that the workforce within the Clothing and Textile Industry does not have the ability to adjust to technology demands, as captured in a recent industry audit of skills, which lists as challenges the absence of "training to enhance technology skills for employees. Lack of transition/change management strategy to align jobs demand and people element, e.g. union engagement and work realities. Due to limited skills of maintenance, the turnaround time to fix the machinery does not meet the expected

standard".***

This raises the question as to whether they have difficulties because they do not recruit from TVET programmes or encourage employees to undertake these programmes, or whether they have difficulties because the TVET programmes that currently exist do not meet their needs and are therefore not used as a requirement.

This level of diversity of the ways that different industries appear to relate to TVET, might, in part, be explained by the decisions that are made within the company with respect to transformation and specifically workplace organisation, technology and the development of new products. While the study cannot identify the causal direction of these changes, it has demonstrated that these decisions coincide with the extent to which skills are required at the different occupational levels and that these differ across the three industries. Thus, whilst the vast majority of companies within the Automotive industry have both introduced new technology and state that this technology is more advanced, in Clothing and Textile many companies indicate that they have not introduced new technology. However, where they have introduced new technology, this is reportedly also more advanced than the previous forms of technology.

This level of consistency within each industry about work organisation, technology, and the development of new products, suggests that these decisions are informed by contextual factors relevant to the industry. Thus far the factors that have emerged as relevant in this regard include whether the company is South African or global and the extent to which the company has a focus on exports. Other factors that appear relevant to this discussion are the industrial strategies that have been employed in each industry and the kinds of incentives that have been put in place with respect to incentives that support the growth of the industry as well as incentives to use TVET or not. An additional external factor could also be the nature of the industry specific labour market. Excessive skills shortage might disincentivize firms from investing in upskilling their workforce as other firms in the same industry might simply poach upskilled workers from them. There may also be other factors internal to the

companies that impact on these decisions. These include factors such as the industrial relations within the firm and the level of unionisation. This could also reflect the level of involvement of industry in TVET programmes.

These observations suggest that TVET strategies cannot be developed in isolation from the industrial development trajectory. The industrial strategy determines the way in which the industry engages with transformation and growth and this in turn has implications for the occupational structure of the company, the level of skills that are required, whether there is a need for a TVET programme or less formal on-the-job training, and how the TVET is provided.

In the case of the Automotive industry there has been a deliberate approach by the relevant industry bodies to support the development of skills through TVET. Whilst the skills shortages (priorities) are primarily located at the higher occupational levels, the industry focuses on TVET provisioning at each occupational level, including general workers. The extent that TVET is integral to the development of the industry is further demonstrated by the number of companies that have put in place the capacity to provide TVET within the workplace or, in some cases, in partnership with public TVET providers. This is in sharp contrast with Clothing and Textile where there is limited focus on TVET and there has been limited focus on the provision of TVET within the industry despite the challenges that the industry is facing in terms of skills and the need for greater levels of productivity.

These findings require a new way of thinking about employer engagement in TVET that is very different from the popular notion of involving employers in discussions about the qualification and what it should contain—the basis of competency-based training reforms. What is even more important is to determine the kinds of changes that the company is introducing and to determine the nature of the programmes that will support this transformation. This requires a focus on the eco-system of companies in a sector and not only on the occupations where there are shortages. The study also highlights that for skills to support transformation and growth there must be a focus on both general education and TVET.

Further, it highlights the need to reflect on the kind of provision arrangements that will work within these environments. The relative success within the Automotive industry, where much of the education and training is provided by workplace providers, highlights the need to understand what about this provision arrangement makes it possible for the industry to embrace the offerings provided. Is it because the training is structured in accordance with the times required by industry? Are the facilitators better able to contextualise the training? Does this modality allow for greater levels of integration? Conversely there is a need to understand why this has not happened within the Clothing and Textile industry despite the active engagement of the unions within the Sectoral Education and Training Authority and a strong political commitment to transforming the industry. What kind of provisioning would work in these environments? To what extent would the availability of individuals with relevant skills create the space for advancing technology in the industry? Does the lack of capacity to purchase new technology explain why there is a limited focus on TVET? Is there a role that TVET can play to support the transformation of the industry and a concomitant increase in productivity?

Across these discussions is the need to understand the role that the public TVET Colleges could play, and the kinds of partnerships that would need to be formed, to allow these institutions to make a meaningful contribution to skills development that supports transformation and growth.

Finally, the ways in which the training levy and other forms of incentives, do – or could - stimulate the provisioning of TVET in a manner that is embedded more firmly within industry also requires attention.

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Notes

* www.statssa.gov.za accessed 23 November 2019

** Defined here in terms of changes in work organisation, technology and/or products

*** Close Out Report of the Clothing Manufacturing Industry Skills Audit, Prepared by: Phumeza Nobhongoza –NBC-PTI Training Advisor, Edited by: Steady Mukondiwa NBC-PTI Director. Date: 29th May 2019

**** Source: StatsSA www.statssa.gov.za/ accessed 10th January 2020; www.quantec.co.za, accessed 5th January 2020; own calculations

Summary of issues to take into account when thinking about TVET

- The size of the companies in the industry—larger companies are more likely to have the capacity to deliver their own formal TVET programmes as is the case with Automotive companies; whether the company is national or a multi-national—this is likely to impact on decisions re workplace organisation and technology and the ways in which skills are perceived; and the culture of the industry in terms of recruitment mechanisms and the extent to which there is an emphasis on human resource development within the industry.
- How TVET supports different occupations. The study suggests that formal TVET resulting in qualifications prior to entering the workplace is particularly important at higher levels. At lower levels companies are less likely to require formal qualifications, so in general, formal training for existing employees at lower levels, who typically don't require a TVET qualification when recruited, is more likely to involve formal TVET programmes.
- Company needs of vocational training might be extremely company specific. Maybe there are very few "generic" skills that can be taught. This needs further exploration.
- Ways to move towards a more embedded approach to TVET include the formal TVET programmes that may be useful for new entrants versus those that are impor-

tant for existing employees and the implications for who and how these are delivered. It is also important to explore the appropriate balance between formal TVET programmes and shorter more focused programmes that address changes such as with respect to products.

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